

What is Claimed is:

1           1.     In a communications network, a communication unit to transmit and  
2 receive information within said network comprising:  
3           a transmitter to transmit outgoing information to at least one other communication  
4 unit within said network;  
5           a receiver to receive incoming information from at least one other communication  
6 unit within said network; and  
7           a processor to control said transmission and reception of said outgoing and  
8 incoming information, wherein said processor includes:  
9           a reservation module to reserve at least one communication link within said  
10 network for communicating with at least one other communication unit and to  
11 dynamically select a frame architecture to facilitate said communications over said  
12 reserved communication link.

1           2.     The unit of claim 1, wherein said network is a wireless Ad-Hoc network  
2 and said incoming and outgoing information includes voice.

1           3.     The unit of claim 1, wherein said transmitter transmits said outgoing  
2 information in the form of radio signals.

1           4.     The unit of claim 1, wherein said receiver receives said incoming  
2 information in the form of radio signals.

1           5.     The unit of claim 1, wherein said frame architecture is compatible with a  
2 Time Division Multiple Access (TDMA) scheme.

1           6.     The unit of claim 1, wherein said frame architecture supports at least one of  
2 duplex and simplex voice communications.

1           7.     The unit of claim 6, wherein said frame architecture further supports  
2 retransmissions.

1           8.       The unit of claim 1, wherein said reservation module includes:  
2           a neighbor module to facilitate transmission of information relating to said  
3 reservation to neighboring communication units in response to reservation of said at least  
4 one communication link, wherein said reservation information is disposed within neighbor  
5 discovery packets periodically transmitted by said unit.

1           9.       The unit of claim 1, wherein said frame architecture includes a plurality of  
2 time slots serving as said communication link, and said reservation module includes:  
3           a reservation request module to facilitate transmission of a reservation packet along  
4 a routing path to a destination communication unit, wherein said reservation packet  
5 requests reservation of particular time slots for communication with said destination unit.

1           10.      The unit of claim 9, wherein said reservation module further includes:  
2           a request module to store time slot reservations received within a reservation  
3 packet from another communication unit and to process said received time slot  
4 reservations in accordance with reservation information within said received reservation  
5 packet.

1           11.      The unit of claim 10, wherein said request module includes:  
2           a slot module to determine, in response to said unit being an intermediate unit  
3 within said routing path, available time slots for transmission and retransmission of  
4 information in accordance with said reservation information, wherein said reservation  
5 information includes information relating to a selected frame architecture and time slots  
6 utilized by previous units within said routing path;  
7           a configuration module to determine, in response to said unit being an intermediate  
8 unit within said routing path, a frame architecture supported by said unit when said  
9 selected frame architecture is incompatible with said unit;  
10          a slot availability module to adjust, in response to said unit being an intermediate  
11 unit within said routing path, a quantity of empty slots within said reservation packet when  
12 said empty slot quantity is greater than a quantity of empty slots associated with said unit;  
13 and

14           a transmission module to transmit, in response to said unit being an intermediate  
15 unit within said routing path, said reservation packet to a succeeding unit within said  
16 routing path.

1           12.    The unit of claim 10, wherein said request module includes:  
2           a frame module to determine, in response to said unit being a destination unit, a  
3 frame architecture supported by each unit within said routing path;  
4           a slot reservation module to reserve, in response to said unit being a destination  
5 unit, said time slots requested for reservation; and  
6           a reservation transmission module to transmit, in response to said unit being a  
7 destination unit, a confirmation packet including reservation information to said unit  
8 requesting a reservation and reservation information to neighboring units.

1           13.    The unit of claim 9, wherein said reservation module further includes:  
2           a reservation confirmation module to process a confirmation packet received in  
3 response to confirmation of a reservation, wherein said confirmation packet includes  
4 information relating to reserved time slots and said frame architecture and is transmitted to  
5 a unit requesting the particular reservation.

1           14.    The unit of claim 13, wherein said reservation confirmation module  
2 includes:  
3           a configuration update module to update, in response to said unit being at least one  
4 of an intermediate routing path unit and said requesting unit, a frame architecture in  
5 accordance with said frame architecture within said confirmation packet;  
6           a slot update module to update, in response to said unit being at least one of an  
7 intermediate routing path unit and said requesting unit, said reserved time slots in  
8 accordance with said updated frame architecture;  
9           a slot selection module to select, in response to said unit being at least one of an  
10 intermediate routing path unit and said requesting unit, time slots to facilitate  
11 communication in a return path;  
12           an acknowledgement reservation module to reserve an acknowledgement slot in  
13 response to said unit being said requesting unit and said frame architecture supporting  
14 retransmission; and

15           a confirmation transmission module to transmit, in response to said unit being at  
16   least one of an intermediate routing path unit and said requesting unit, confirmation  
17   information to neighboring units, wherein said confirmation information includes said  
18   frame architecture and time slots.

1           15.    The unit of claim 1, wherein said processor further includes:  
2           a voice transmission module to process voice signals received by said unit and  
3   facilitate transmission of said processed voice signals over said reserved communication  
4   link.

1           16.    The unit of claim 15, wherein said voice transmission module includes:  
2           a silence detection module to detect silence frames within said received voice  
3   signals and prevent transmission of said detected silence frames.

1           17.    The unit of claim 15, wherein said processor further includes:  
2           a retransmission module to facilitate retransmission of voice information in  
3   response to absence of an acknowledgement of said transmitted voice signals.

1           18.    The unit of claim 17, wherein said voice transmission module facilitates  
2   transmission of said processed voice signals on a first frequency channel, and said  
3   retransmission module facilitates retransmission of said processed voice signals on a  
4   second different frequency channel.

1           19.    The unit of claim 18, wherein said frame architecture includes transmission  
2   slots within a first half of said frame and retransmission slots within a second half of said  
3   frame.

1           20.    The unit of claim 15, wherein said processor further includes:  
2           a voice reception module to receive voice information from said network and  
3   process said received voice signals for conveyance to a user.

1           21.    The unit of claim 15, wherein said processor further includes:

2 a termination module to terminate communications over said at least one reserved  
3 communication link and to remove said reservation of said at least one communication  
4 link.

1 22. The unit of claim 1, wherein said unit includes a data channel to facilitate  
2 said reservation and a voice channel to facilitate transfer of voice information, and said  
3 processor further includes:

4 a data allocation module to allocate data to said voice channel in response to  
5 utilization of said voice channel being below a first utilization threshold and utilization of  
6 said data channel being greater than a second utilization threshold; and

7 a voice allocation module to allocate voice information to said data channel in  
8 response to utilization of said data channel being below said first utilization threshold and  
9 utilization of said voice channel being greater than said second utilization threshold;

10 wherein said first utilization threshold indicates light utilization and said second  
11 utilization threshold indicates heavy utilization.

1 23. In a communication unit of a network, a method of transferring information  
2 with other communication units within said network comprising:

3 (a) reserving at least one communication link within said network for  
4 communications with at least one other communication unit and dynamically selecting a  
5 frame architecture to facilitate said communications over said reserved communication  
6 link.

1 24. The method of claim 23, wherein said network is a wireless Ad-Hoc  
2 network and said information includes voice.

1 25. The method of claim 23, wherein said frame architecture is compatible with  
2 a Time Division Multiple Access (TDMA) scheme.

1 26. The method of claim 23, wherein said frame architecture supports at least  
2 one of duplex and simplex voice communications.

1           27.     The method of claim 26, wherein said frame architecture further supports  
2 retransmissions.

1           28.     The method of claim 23, wherein step (a) further includes:

2           (a.1)   transmitting information relating to said reservation to neighboring  
3 communication units in response to reservation of said at least one communication link,  
4 wherein said reservation information is disposed within neighbor discovery packets  
5 periodically transmitted by said communication unit.

1           29.     The method of claim 23, wherein said frame architecture includes a  
2 plurality of time slots serving as said communication link, and step (a) further includes:

3           (a.1)   transmitting a reservation packet along a routing path to a destination  
4 communication unit, wherein said reservation packet requests reservation of particular  
5 time slots for communication with said destination unit.

1           30.     The method of claim 29, wherein step (a) further includes:

2           (a.2)   storing time slot reservations received within a reservation packet from  
3 another communication unit and processing said received time slot reservations in  
4 accordance with reservation information within said received reservation packet.

1           31.     The method of claim 30, wherein step (a.2) further includes:

2           (a.2.1) determining, in response to said unit being an intermediate unit within said  
3 routing path, available time slots for transmission and retransmission of information in  
4 accordance with said reservation information, wherein said reservation information  
5 includes information relating to a selected frame architecture and time slots utilized by  
6 previous units within said routing path;

7           (a.2.2) determining, in response to said unit being an intermediate unit within said  
8 routing path, a frame architecture supported by said unit when said selected frame  
9 architecture is incompatible with said unit;

10          (a.2.3) adjusting, in response to said unit being an intermediate unit within said  
11 routing path, a quantity of empty slots within said reservation packet when said empty slot  
12 quantity is greater than a quantity of empty slots associated with said unit; and

13           (a.2.4) transmitting, in response to said unit being an intermediate unit within said  
14 routing path, said reservation packet to a succeeding unit within said routing path.

1           32.     The method of claim 30, wherein step (a.2) further includes:

2           (a.2.1) determining, in response to said unit being a destination unit, a frame  
3 architecture supported by each unit within said routing path;

4           (a.2.2) reserving, in response to said unit being a destination unit, said time slots  
5 requested for reservation; and

6           (a.2.3) transmitting, in response to said unit being a destination unit, a  
7 confirmation packet including reservation information to said unit requesting a reservation  
8 and reservation information to neighboring units.

1           33.     The method of claim 29, wherein step (a) further includes:

2           (a.2)   processing a confirmation packet received in response to confirmation of a  
3 reservation, wherein said confirmation packet includes information relating to reserved  
4 time slots and said frame architecture and is transmitted to a unit requesting the particular  
5 reservation.

1           34.     The method of claim 33, wherein step (a.2) further includes:

2           (a.2.1) updating, in response to said unit being at least one of an intermediate  
3 routing path unit and said requesting unit, a frame architecture in accordance with said  
4 frame architecture within said confirmation packet;

5           (a.2.2) updating, in response to said unit being at least one of an intermediate  
6 routing path unit and said requesting unit, said reserved time slots in accordance with said  
7 updated frame architecture;

8           (a.2.3) selecting, in response to said unit being at least one of an intermediate  
9 routing path unit and said requesting unit, time slots to facilitate communication in a return  
10 path;

11           (a.2.4) reserving an acknowledgement slot in response to said unit being said  
12 requesting unit and said frame architecture supporting retransmission; and

13           (a.2.5) transmitting, in response to said unit being at least one of an intermediate  
14 routing path unit and said requesting unit, confirmation information to neighboring units,  
15 wherein said confirmation information includes said frame architecture and time slots.

1           35.     The method of claim 23 further including:  
2           (b)     processing voice signals received by said unit and transmitting said  
3     processed voice signals over said reserved communication link.

1           36.     The method of claim 35, wherein step (b) further includes:  
2           (b.1)   detecting silence frames within said received voice signals and preventing  
3     transmission of said detected silence frames.

1           37.     The method of claim 35, further including:  
2           (c)     retransmitting voice information in response to absence of an  
3     acknowledgement of said transmitted voice signals.

1           38.     The method of claim 37, wherein step (b) further includes:  
2           (b.1)   transmitting said processed voice signals on a first frequency channel; and  
3           step (c) further includes:  
4           (c.1)   retransmitting said processed voice signals on a second different frequency  
5     channel.

1           39.     The method of claim 38, wherein said frame architecture includes  
2     transmission slots within a first half of said frame and retransmission slots within a second  
3     half of said frame.

1           40.     The method of claim 35 further including:  
2           (c)     receiving voice information from said network and processing said received  
3     voice signals for conveyance to a user.

1           41.     The method of claim 35 further including:  
2           (c)     terminating communications over said at least one reserved communication  
3     link and removing said reservation of said at least one communication link.

1           42.     The method of claim 23, wherein said unit includes a data channel to  
2     facilitate said reservation and a voice channel to facilitate transfer of voice information,  
3     and step (a) further includes:



4 (a.1) allocating data to said voice channel in response to utilization of said voice  
5 channel being below a first utilization threshold and utilization of said data channel being  
6 greater than a second utilization threshold; and

7 (a.2) allocating voice information to said data channel in response to utilization  
8 of said data channel being below said first utilization threshold and utilization of said  
9 voice channel being greater than said second utilization threshold;

10 wherein said first utilization threshold indicates light utilization and said second  
11 utilization threshold indicates heavy utilization.

1 43. A communications network comprising:

2 a plurality of communication units for transferring information therebetween,  
3 wherein at least one communication link within said network is reserved by a  
4 communication unit for communicating with at least one other communication unit and  
5 said communicating units dynamically select a frame architecture to facilitate said  
6 communications over said reserved communication link.

1 44. The network of claim 43, wherein said network is a wireless Ad-Hoc  
2 network and said information includes voice.

1 45. In a communications network, a method of transferring information  
2 between communication units within said network comprising:

3 (a) reserving at least one communication link within said network for  
4 communications between at least two communication units, wherein said communicating  
5 units dynamically select a frame architecture to facilitate said communications over said  
6 reserved communication link.

1 46. The method of claim 45, wherein said network is a wireless Ad-Hoc  
2 network and said information includes voice.